

This listing of claims will replace all prior versions, and listings, of claims in the application:

### **Listing of Claims**

1. (currently amended) A method of channel estimation in a wireless orthogonal frequency division multiplexed (OFDM) communication system ~~(700)~~, comprising the steps of:
  - receiving a signal in ~~the~~ time domain;
  - applying a Fourier transform to said received signal to obtain a frequency domain signal including a plurality of sub-carriers;
  - estimating probabilities of coded bits for at least said plurality of frequency domain sub-carriers; and
  - performing channel coefficient estimation for at least said plurality of frequency domain sub-carriers ~~characterised in that~~  
~~—said step of performing channel coefficient estimation for each of said plurality of frequency domain sub-carriers uses~~ using channel coefficient estimates for at least one other of said plurality of frequency domain sub-carriers.
2. (original) A method of channel estimation according to Claim 1, wherein said step of performing channel coefficient estimation for substantially each of said plurality of frequency domain sub-carriers uses channel coefficient estimation benefits from said channel coefficient estimates for substantially all the other frequency domain sub-carriers of said plurality.
3. (original) A method of channel estimation according to Claim 2, wherein said plurality of frequency domain sub-carriers comprises substantially all the sub-carriers of said frequency domain signal.
4. (original) A method of channel estimation according to Claim 1 further comprising repeating said steps of estimating probabilities and performing channel coefficient estimation so as to improve iteratively an accuracy of said channel coefficient estimates.

5. (currently amended) A method of channel estimation according to Claim 4, wherein ~~the~~ a kth channel coefficient estimation is substantially in accordance with the following equation:

$$H_k^{(p+1)} = \frac{P(y_k | x_k, H_k^{(p)}) [y_k \bar{x}_k - \sigma^2 (\Delta^{-1})_k \tilde{H}^{(k)}]}{P(y_k | x_k, H_k^{(p)}) \left[ |x_k|^2 - \frac{\sigma^2}{v^2} + \frac{v^2}{\gamma^2} \right]}$$

where  $H_k^{(p+1)}$  is the (p+1)th estimate and  $H_k^{(p)}$  the pth estimate of the channel coefficients,  $y_k$  is the received data corresponding to the transmitted data  $x_k$ ,  $\sigma^2$  is the channel noise variance,  $\tilde{H}^{(k)}$  is the channel coefficient vector H with a 0 on the kth component and  $\Delta^{-1}$ ,  $v^2$  and  $\gamma^2$  have the meanings indicated hereinabove.

6. (original) A method of channel estimation according to Claim 4, wherein the step of performing channel coefficient estimates comprises replacing previously estimated channel coefficients of said plurality of frequency domain sub-carriers with respective current channel coefficient estimates.

7. (original) A method of channel estimation according to Claim 4, wherein repeating said step of performing channel coefficient estimation comprises applying a cost function on an Expectation-Maximization algorithm on said plurality of frequency domain sub-carriers to improve said channel coefficient estimates.

8. (currently amended) A method of channel estimation according to Claim 7, wherein said step of performing a channel coefficient estimation includes calculating an auxiliary function, the method further ~~characterised~~ comprising by the step of:

performing a Maximisation process on said auxiliary function in substantially the following manner:

$$Q(H_m, H_m^{(p)}) = E_{x_m} \left[ \log P(x_m, y_m, \tilde{H}^{(m)} | H_m) | y_m, H_m^{(p)} \right]$$

9. (currently amended) A method of channel estimation according to Claim 4, wherein said step of performing a channel coefficient estimation ~~includes~~ comprises applying a forward-backward algorithm on said received signal to said plurality of channel coefficient estimates in which estimates are made in a first order of said plurality of frequency domain sub-carriers and subsequently estimates are made in a reversed order of said plurality of frequency domain sub-carriers so as substantially to equalise an estimation accuracy across said plurality of frequency domain sub-carriers.

10. (currently amended) A system for channel estimation in an~~An~~ orthogonal frequency division multiplexed (OFDM) receiver, the system~~for a method of channel estimation as claimed in any preceding Claim, and~~ comprising:

demodulation means for applying ~~said~~ Fourier transform to ~~said~~ a received signal to obtain ~~said~~ a frequency domain signal including a plurality of sub-carriers;

decoding means for decoding the received signal and estimating ~~said~~ probabilities of coded bits for at least said plurality of frequency domain sub-carriers; and

channel estimation means for performing channel coefficient estimation for each of said plurality of frequency domain sub-carriers using channel coefficient estimates for at least one other of said plurality of frequency domain sub-carriers.